

## CLAIMS

5. 1. A chuck for a probe station comprising:

- (a) a first chuck assembly element having an upper surface thereon suitable to support a wafer; and
- (b) a chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

10. 2. The chuck of claim 1 wherein said chuck spacing mechanism maintain said first chuck assembly element and said another chuck assembly element in a rigid relationship with respect to each other.

15. 3. The chuck of claim 1 wherein each of said supports are substantially equal distant from one another.

20. 4. The chuck of claim 1 wherein each of said supports is free from directly electrically interconnecting said first chuck assembly element and said another chuck assembly element.

25. 5. The chuck of claim 1 wherein said first chuck assembly element is electrically connected to a ground path.

30. 6. The chuck of claim 5 wherein said another chuck assembly element is electrically connected to a ground path.

7. The chuck of claim 1 further comprising:

- (a) said first chuck assembly element having a lower surface, said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) said another chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

8. The chuck of claim 1 further comprising:

- (a) said first chuck assembly element having a lower surface defining at least one recess therein; and
- (b) a cover plate in overlying relationship to said lower surface of said first chuck assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

9. The chuck of claim 1 comprising:

- (a) a first chuck assembly element having a lower surface, said first chuck assembly element defining at least one first air path therein to said upper surface;

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- (b) said another chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and
- 10 (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path.

15 10. The chuck of claim 9 wherein said interconnecting member is located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said another chuck assembly element.

20 11. The chuck of claim 1 comprising:

- (a) said first chuck assembly element having a lower surface;
- (b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element; and
- 25 (c) a cover plate in overlying relationship to at least a major portion of said lower surface of said another chuck assembly element proximate said chuck spacing mechanism element.

30 12. The chuck of claim 1 comprising:

- (a) said first chuck assembly element having a lower surface;

b said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element; and

(c) at least one of said supports including an insulator having a first surface and a second surface surrounding at least a portion of said at least one supports between the upper and lower surfaces of said another chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said another chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said at least one support.

13. The chuck of claim 1 wherein said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

25 14. The chuck of claim 1 comprising:

(a) said first chuck assembly element having a lower surface;

(b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element; and

(c) at least one of said supports including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said another chuck assembly element and a second surface in

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pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

15. The chuck of claim 1 comprising:

- (a) said first chuck assembly element having a lower surface;
- (b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) at least one of said supports including an insulator having a first surface in pressing engagement with said upper surface of said another chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

16. The chuck of claim 1 further comprising:

- (a) said first chuck assembly element having a lower surface;
- (b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element; and
- (c) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said another chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

17. A chuck for a probe station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface suitable to support a wafer, said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) a second chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck

assembly defining at least one second air path therein; and

(c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

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18. The chuck of claim 17 further comprising:

(a) said first chuck assembly element defining a first opening in said lower surface of said first chuck assembly element; and  
(b) said interconnecting member engaged with said first opening.

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19. The chuck of claim 17 further comprising:

(a) said second chuck assembly element defining a second opening in said upper surface of said second chuck assembly element; and  
(b) said interconnecting member engaged with said second opening.

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20. The chuck of claim 18 further comprising:

(a) said first chuck assembly element defining a first opening in said lower surface of said first chuck assembly element; and  
(b) said interconnecting member engaged with said first opening.

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21. The chuck of claim 20 wherein said

interconnecting member is engaged with said first and second openings in a manner that provides a vacuum seal.

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21. The chuck of claim 11 wherein said interconnecting member includes an elongate opening defined therein to interconnect said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path.

22. The chuck of claim 17 further comprising a chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and said second chuck assembly element.

23. The chuck of claim 17 further comprising:  
15 (a) said lower surface of first chuck assembly element defining at least one recess therein; and  
(b) a cover plate in overlying relationship to said lower surface of said first chuck assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

24. The chuck of claim 17 further comprising:  
20 (a) a cover plate in overlying relationship to said lower surface of said first chuck assembly element defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.  
25 (b) a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly proximate said chuck spacing mechanism element.

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in a generally U-shaped conductive spacer,  
a second surface of said U-shaped  
conductive spacer in pressing engagement  
with said lower surface of said first  
chuck assembly element.

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28. The chuck of claim 17 further comprising:  
(a) a chuck spacing mechanism interconnecting  
said first and second chuck assembly  
elements and defining the spacing between  
said first and second chuck assembly  
elements; and  
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(b) said chuck spacing mechanism including an  
insulator having a first surface in  
pressing engagement with said upper  
surface of said second chuck assembly  
element and a second surface in pressing  
engagement with a first surface of a  
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conducting spacer, a second surface of  
said conductive spacer in pressing  
engagement with said lower surface of said  
first chuck assembly element, where said  
first surface of said insulator in  
pressing engagement with said upper  
surface is substantially directly opposing  
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and coextensive with said second surface  
of said insulator in pressing engagement  
with said conductive spacer.

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29. The chuck of claim 17 further comprising:  
(a) a chuck spacing mechanism interconnecting  
said first and second chuck assembly  
elements and defining the spacing between  
said first and second chuck assembly  
elements; and  
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(b) said chuck spacing mechanism including an  
insulator having a first surface in

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pressing engagement with said upper  
surface of said second chuck assembly  
element and a second surface in pressing  
engagement with a first surface of a  
conductive spacer, a second surface of  
said conductive spacer in pressing  
engagement with said lower surface of said  
first chuck assembly element, where said  
first surface of said insulator in  
pressing engagement with said upper  
surface is less than one third the  
thickness of said conductive spacer in  
pressing engagement with said second  
surface.

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30. A chuck for a probe station comprising:  
(a) a first chuck assembly element having a  
lower surface and an upper surface,  
(b) said lower surface of first chuck assembly  
element defining at least one recess  
therein; and  
(c) a cover plate in overlying relationship to  
said lower surface of said first chuck  
assembly element together defining at  
least a portion of an air path to said  
upper surface suitable for providing a  
vacuum to said wafer supported by said  
upper surface.

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31. The chuck of claim 30 wherein said upper  
surface is suitable to support a wafer.

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32. The chuck of claim 30 further comprising a  
second chuck assembly element wherein said second chuck  
assembly element is suitable to support a wafer.

33. The chuck of claim 30 wherein said cover plate is substantially thinner than said first chuck assembly element.

5 34. The chuck of claim 30 wherein said cover plate is substantially coplanar with said first chuck assembly element

10 35. The chuck of claim 30 wherein said cover plate is in an overlying relationship to a major portion of said lower surface of said first chuck assembly element.

15 36. The chuck of claim 30 further comprising said lower surface of first chuck assembly element defining a plurality of recesses, each of which is concentric with respect to each other.

20 37. The chuck of claim 36 further comprising:

(a) said first chuck assembly element having said upper surface thereon suitable to support a wafer; and

25 (b) a chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

30 38. The chuck of claim 30 further comprising:

(a) said first chuck assembly element having said upper surface suitable to support a wafer, said first chuck assembly element defining at least one first air path thereon to said upper surface;

(b) a second chuck assembly element having an upper surface in apposite relationship;

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said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and

5 (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

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39. The chuck of claim 30 further comprising:

15 (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;

(b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;

20 (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and

(d) a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly proximate said chuck spacing mechanism element.

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40. The chuck of claim 31 further comprising:

(a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;

- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

41. The chuck of claim 30 further comprising:

- (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing

relationship to said lower surface of said first chuck assembly element;

(c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and

(d) said chuck spacing mechanism including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

42. The chuck of claim 30 further comprising:

(a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;

(b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;

(c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and

(d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element.

element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

43. The chuck of claim 30 further comprising:

- (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said

first surface of said insulator in  
pressing engagement with said upper  
surface is less than one third the  
thickness of said conductive spacer in  
pressing engagement with said second  
surface.

44. A chuck for a probe station comprising:  
(a) a first chuck assembly element having a  
lower surface and an upper surface  
suitable to support a wafer, said first  
chuck assembly element defining at least  
one first air path therein to said upper  
surface;  
(b) a second chuck assembly element having an  
upper surface in opposing relationship to  
said lower surface of said first chuck  
assembly element, said second chuck  
assembly defining at least one second air  
path therein; and  
(c) an interconnecting member interconnecting  
said first air path and said second air  
path in such a manner that a vacuum may be  
provided from said first air path to said  
second air path, said interconnecting  
member located closer the periphery of  
said first chuck assembly element than a  
nearest member determining, at least in  
part, the spacing between said first chuck  
assembly element and said second chuck  
assembly element.

45. A chuck for a probe station comprising:  
(a) a first chuck assembly element having a  
lower surface and an upper surface therein  
suitable to support a wafer;

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- b a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly proximate said chuck spacing mechanism element.

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46. The chuck of claim 45 further comprising said chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

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46. The chuck of claim 45 further comprising:

- (a) said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

45. The chuck of claim 45 further comprising:

- (a) said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said second chuck assembly element.

49. The chuck of claim 45 further comprising said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

53. The chuck of claim 45 further comprising said chuck spacing mechanism including a tapered stepped insulator having a first surface in pressing engagement with said upper surface of said second chuck

assembly element and a second surface in pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

51. The chuck of claim 45 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

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52. The chuck of claim 45 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

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53. A chuck for a probe station comprising:  
a. a first chuck assembly element having a lower surface and an upper surface thereon, suitable to support a wafer;

- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

30 54. The chuck of claim 53 wherein the portion  
of said insulator between the upper and lower surfaces of  
said second chuck assembly is kept free from contact with  
said chuck spacing mechanism have generally include an  
upper surface that is free from contact with said  
second chuck assembly element.

55. The chuck of claim 53 further comprising said chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

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56. The chuck of claim 53 further comprising:

- (a) said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

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57. The chuck of claim 53 further comprising:

- (a) said lower surface of first chuck assembly element defining at least one recess therein; and
- (b) a cover plate in overlying relationship to said lower surface of said first chuck assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

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58. The chuck of claim 53 further comprising:

- (a) said first chuck assembly element defining at least one first air path therein to said upper surface;

- (b) said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said second chuck assembly element.

15               59. The chuck of claim 53 further comprising a  
cover plate in overlying relationship to at least a major  
portion of said lower surface of said second chuck  
assembly proximate said chuck spacing mechanism element.

20                 60. The chuck of claim 53 further comprising  
said chuck spacing mechanism including a generally U-  
shaped insulator having a first surface in pressing  
engagement with said upper surface of said second chuck  
assembly element and a second surface in pressing  
25                 engagement with a first surface of a generally U-shaped  
conductive spacer, a second surface of said U-shaped  
conductive spacer in pressing engagement with said lower  
surface of said first chuck assembly element.

61. The chuck of claim 53 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a lift tube spacer, a second surface of said lift tube spacer in pressing engagement with said lower surface of said first chuck assembly element, where said

first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

5 spacer.

62. The chuck of claim 53 further comprising  
said chuck spacing mechanism including an insulator  
having a first surface in pressing engagement with said  
upper surface of said second chuck assembly element and a  
second surface in pressing engagement with a first  
surface of a conductive spacer, a second surface of said  
conductive spacer in pressing engagement with said lower  
surface of said first chuck assembly element, where said  
first surface of said insulator in pressing engagement  
with said upper surface is less than one third the  
thickness of said conductive spacer in pressing  
engagement with said second surface.

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63. A chuck for a probe station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface thereon suitable to support a wafer;
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including a generally U-shaped insulating barrier having a first surface in pressing engagement with said upper surface of said second chuck

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assembly element and a second surface in pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

64. The chuck of claim 63 wherein said chuck spacing mechanism includes a central member extending there through.

65. The chuck of claim 64 wherein said central member is rigidly attachable to said first chuck assembly element.

66. The chuck of claim 65 wherein said central member is electrically isolated from said second chuck assembly element.

67. The chuck of claim 66 wherein said central member secures said first and second chuck assembly elements together with said U-shaped insulator and said U-shaped conductive spacer defining said spacing.

68. A chuck for a probe station comprising:  
(a) a first chuck assembly element having a lower surface and an upper surface thereon suitable to support a wafer;  
(b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;  
(c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between

said first and second chuck assembly elements; and

(d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

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69. The chuck of claim 68 wherein said chuck spacing mechanism includes a central member extending there through.

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70. The chuck of claim 69 wherein said central member is rigidly attachable to said first chuck assembly element.

71. The chuck of claim 70 wherein said central member is electrically isolated from said second chuck assembly element.

72. The chuck of claim 71 wherein said central member secures said first and second chuck assembly elements together with said insulator and said conductive spacer in pressing engagement.

73. A chuck for a print station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface thereon suitable to support a wafer;
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

74. The chuck of claim 73 wherein said chuck spacing mechanism includes a central member extending there through.

75. The chuck of claim 74 wherein said central member is rigidly attachable to said first chuck assembly element.

9 76. The chuck of claim 75 wherein said central member is electrically isolated from said second chuck assembly element.

10 77. The chuck of claim 76 wherein said central member secures said first and second chuck assembly elements together with said insulator and said conductive spacer defining said spacing.